Candida auris Reporting, Surveillance, and Laboratory Testing

November 9th, 2022

Presented by Webinar
Objectives

• Review the epidemiology of *Candida auris* (*C. auris*) in California
• Introduce *C. auris* reporting and isolate submission requirements
• Describe *C. auris* testing available through CDPH Microbial Diseases Laboratory (MDL) and West Region Antimicrobial Resistance (AR) Lab Network
• Present resources and guidance for preventing and responding to *C. auris* cases
Candida auris
Candida auris

- *Candida* species resistant to multiple classes of antifungals
  - Invasive infections associated with 30 to 72% mortality*
  - Recent report of 2 simultaneous and independent clusters of near pan-resistant *C. auris***

- Very difficult to limit spread and eliminate from patient environment
  - Cleaning and disinfection requires agents effective against *C. auris* (List P or List K)
  - Recent study found contaminated beds and handrails for 3 residents who did NOT test positive for *C. auris*.
    - All 3 residents were in rooms recently vacated by a *C. auris* positive resident***

- Patients can remain colonized for many months, with no “clearance” recommendations

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POLL: What year was *Candida auris* first discovered?

1. 400 BCE
2. 1729
3. 1917
4. 2009
POLL: What year was *Candida auris* first discovered?

1. 400 BCE (**C. albicans**)

2. 1729 (**Aspergillus**)

3. 1917 (**C. glabrata**)

4. 2009 (**C. auris**)

HEALTHCARE-ASSOCIATED INFECTIONS PROGRAM
POLL: Using whole genome sequencing, epidemiologists estimate *C. auris* emerged from which region?

1. East Asia
2. South America
3. South Africa
4. South Asia
5. All of the Above
POLL: Using whole genome sequencing, epidemiologists estimate *C. auris* emerged from which region?

1. East Asia
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4. South Asia
5. All of the Above
**C. auris** is a Major Threat to Public Health

- WHO recently released a [fungal pathogen priority report](https://www.who.int/publications/i/item/9789240060241), designating *C. auris* a critical priority for global public health
- CDC’s [2019 Antibiotic Resistance Threat Report](https://www.cdc.gov/drugresistance/biggest-threats.html) also listed *C. auris* as an urgent, top tier, threat to patient safety in the United States
C. auris is a Major Threat to Public Health

Diagnostics

• Laboratory testing for *Candida auris*
  • Culture-based
    • Most common type of yeast ID in clinical labs*
    • Yeast misidentification is rare but labs should be aware of possibility for misclassification
      (www.cdc.gov/fungal/candida-auris/identification.html)

* 347/380 (91%) of hospitals use a lab that performs culture-based yeast identification (including MALDI-TOF)
Source: NHSN Annual Survey, 2021 (PDF) (www.cdc.gov/nhsn/forms/57.103_pshospsurv_blank.pdf)
Diagnostics

• Laboratory testing for *Candida auris*
  • Culture-based
    • Most common type of yeast ID in clinical labs*
    • Yeast misidentification is rare but labs should be aware of **possibility for misclassification** (www.cdc.gov/fungal/candida-auris/identification.html)
  • Culture-independent diagnostic tests (CIDT)
    • Minority of labs use CIDT to identify *C. auris* from clinical specimens**
    • Preferred for screening specimens (e.g., axilla/groin, skin, nares swabs)

* 347/380 (91%) of hospitals use a lab that performs culture-based yeast identification (including MALDI-TOF)
** 60/380 (17%) of hospitals report using a lab that performs CIDT to identify *C. auris* from clinical specimens

Source: NHSN Annual Survey, 2021 (PDF) (www.cdc.gov/nhsn/forms/57.103_pshospsurv_blank.pdf)
Candida Species Identification in Sterile Sites

- CDC recommends identifying all Candida isolates from normally sterile sites to the species level
  - Likely indicate invasive infection requiring treatment

Clinical C. auris Cases Reported in California

- Blood: 32%
- Urine: 25%
- Respiratory: 21%
- Wound: 13%
- Other: 7%
- Tissue: 1%
- Abscess: 0.3%

Number of Reported Cases (n=631)
Candida Species Identification in Non-sterile Sites

- Identify Candida isolates from non-sterile sites to the species level:
  - when clinically indicated for patient care
  - for additional case detection (prospective surveillance)
  - for patients at high risk for C. auris acquisition
    - LTACH patients or vSNF residents
    - from known C. auris outbreak facilities
    - close healthcare contacts
    - colonized or infected with a CPO
    - had overnight healthcare exposure outside the US in the past year

Clinical C. auris Cases Reported in California

LTACH=long-term acute care hospital, vSNF=ventilator-equipped skilled nursing facility, CPO=carbapenemase-producing organism

CDPH C. auris Webpage (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Candida-auris.aspx)
Candida Species Identification by Specimen Source, NHSN 2021

*Candida* identified from which body site are usually identified to the species level?

- Blood: 93%
- Other normally sterile body site (e.g., CSF): 90%
- Urine: 50%
- Respiratory: 39%
- Wounds*: 8%
- Genital and/or Throat: 2%
- None: 4%

*Respondents indicate they identify *Candida* isolates to the species level only for specific wound specimens

Source: NHSN Annual Survey, 2021 (PDF) (www.cdc.gov/nhsn/forms/57.103_pshospsurv_blank.pdf)
C. auris in the United States

REPORTED CLINICAL CASES OF CANDIDA AURIS, 2017

REPORTED CLINICAL CASES OF CANDIDA AURIS, 2019

REPORTED CLINICAL CASES OF CANDIDA AURIS, 2021

Reported clinical cases of Candida auris, June 1, 2021-May 31, 2022

Source: CDC Tracking Candida auris (www.cdc.gov/fungal/candida-auris/tracking-c-auris.html)
C. auris Cases Reported in California through September 2022 (N=3863)
C. auris Cases Reported in California through September 2022 (N=3863)

- **1st COVID-19 surge**
- **2nd COVID-19 surge**
- **3rd COVID-19 surge**

1st outbreak in Orange County contained
HEALTHCARE-ASSOCIATED INFECTIONS PROGRAM

C. auris Cases Reported in California, February 2019–September 2022

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 2019</td>
<td>1-10</td>
</tr>
<tr>
<td>December 2019</td>
<td>11-100</td>
</tr>
<tr>
<td>June, 2020</td>
<td>101-500</td>
</tr>
<tr>
<td>January, 2021</td>
<td>501-1000</td>
</tr>
<tr>
<td>August, 2021</td>
<td>1001-2000</td>
</tr>
<tr>
<td>January, 2022</td>
<td>1001-2000</td>
</tr>
<tr>
<td>September, 2022</td>
<td>1001-2000</td>
</tr>
</tbody>
</table>

(Maps showing the distribution of cases by county for each month from February 2019 to September 2022.)
C. auris Reporting
Reporting *Candida auris*

- **Laboratories electronically report:**
  - Detection of *C. auris* in a specimen using either culture or a validated culture-independent test (e.g., nucleic acid amplification test [NAAT])

- **Providers submit reports to their local health department (LHD):**
  - Patient, facility, and epidemiological risk factors

- **Laboratory submission requirement**
  - Isolates from sterile site specimens (e.g., blood) within 10 working days, batching OK
  - No requirement to obtain fungal culture if not available; LHD may request other isolates, and more timely
Electronic Lab Reporting

- Laboratories electronically report test results to state and local public health departments using a set of standards known as Health Level 7 messaging.

- ELR use SNOMED and LOINC codes to standardize messages:
  - ELRs must include clear information on specimen source, genus & species.
  - CDPH encourages reporting test type and antifungal susceptibility results.
  - CDPH ELR Guidance (www.cdph.ca.gov/Programs/CID/DCDC/Pages/CalREDIE-ELR.aspx) lists commonly used SNOMED and LOINC codes.

- Non-Participating Jurisdictions (e.g., San Diego)
- Other CDPH Programs (e.g., Office of AIDS)
Candida auris Provider Report Form

- Standardized case report form for providers to complete
  - Data elements align with CalREDIE forms
    - Demographic and laboratory data
  - Case investigation details
- The provider report form is most important when a case is newly identified in a region or facility
  - Less urgent for cases in a facility with multiple previous positives (e.g., patient identified on Round 2 of a point prevalence survey)
Candida auris Provider Report Form

- Standardized case report form for providers to complete
  - Data elements align with CalREDIE forms
    - Demographic and laboratory data
  - Case investigation details
- The provider report form is most important when a case is newly identified in a region or facility
  - Less urgent for cases in a facility with multiple previous positives (e.g., patient identified on Round 2 of a point prevalence survey) → Local Health Departments can decide when a complete provider report form is required
Provider Report Form and Investigation

- Provider report form contains key information to inform a case or outbreak investigation, including:
  - Patient demographics
    - New California legal requirements to collect race/ethnicity data*
  - Admission source and status
  - Discharge date and disposition
  - Laboratory information (can confirm ELR)
  - Potential exposures or risk factors
    - Healthcare outside the US
    - Admission from a facility experiencing an outbreak

*Assembly Bill 532 (leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB532)
**Candida auris** Provider Reporting: Demographic Information

**CANDIDA AURIS CASE REPORT FORM**

*Please note, reporters in Los Angeles County should use the form available on the LACDPH website*

<table>
<thead>
<tr>
<th>PATIENT INFORMATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Name, First Name</td>
<td>MI</td>
</tr>
<tr>
<td>Address (Number, Street)</td>
<td>State</td>
</tr>
</tbody>
</table>

**Current Gender Identity**
- □ Male
- □ Female
- □ Genderqueer or non-binary
- □ Identity not listed (specify): __________

**Sex Assigned at Birth**
- □ Male
- □ Female
- □ Declined to answer
- □ Unknown

**Patient Ethnicity**
- □ Hispanic/Latino
- □ Non-Hispanic/Non-Latino
- □ Unknown

**Patient Race**
- □ African-American/Black
- □ American Indian/Alaska Native
- □ Asian (check all that apply)
  - □ Asian Indian
  - □ Hmong
  - □ Thai
  - □ Cambodian
  - □ Japanese
  - □ Vietnamese
  - □ Chinese
  - □ Korean
  - □ Filipino
  - □ Lao
  - □ Other (specify): __________
- □ Pacific Islander (check all that apply)
  - □ Native Hawaiian
  - □ Samoan
  - □ Guamanian
  - □ Other (specify): __________
- □ White
- □ Other (specify): __________
- □ Unknown

**Pregnant?**
- □ Yes
- □ No
- □ Unknown

If yes, estimated delivery date: __________

Los Angeles County healthcare facilities should use the LACDPH form.
### Candida auris Provider Reporting: Facility and Laboratory Information

#### FACILITY INFORMATION

<table>
<thead>
<tr>
<th>Reporting Provider Name</th>
<th>Reporting Facility Name</th>
<th>Facility Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>□ Emergency Department</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Acute Care Hospital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Ventilator-equipped SNF (vSNF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Outpatient Clinic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Skilled Nursing Facility (SNF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Long-Term Acute Care Hospital (LTACH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Other (please specify):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address (Number, Street)</th>
<th>Suite/Unit No.</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Admit Date</th>
<th>Admission Source (If Date of Collection within 7 days after admission)</th>
<th>Currently Admitted?</th>
<th>Death/Discharge Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Home □ Hospital □ LTACH □ SNF □ vSNF □ Other (please specify):___________</td>
<td>□ Yes □ Discharged</td>
<td>□ Yes □ Discharged</td>
</tr>
<tr>
<td></td>
<td>□ Unknown Facility Name: ____________________________</td>
<td>□ Died □ Unknown</td>
<td>□ Died □ Unknown</td>
</tr>
<tr>
<td></td>
<td>□ Out-of-State Facility? □ Yes □ No □ Unknown If yes, state: ______________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If discharged to another facility, please provide facility name</th>
<th>If discharged home, was there a home health referral?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Yes □ No □ Unknown If yes, name of agency: __________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Submitted by</th>
<th>Telephone Number</th>
<th>Fax Number</th>
<th>Date Submitted</th>
<th>Reported To</th>
</tr>
</thead>
</table>

#### LABORATORY INFORMATION

<table>
<thead>
<tr>
<th>Date of Collection</th>
<th>Date of Final Result</th>
<th>Specimen Source (If Multiple Positive Specimens, Select Source with Earliest Collection Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>□ Abscess □ Blood □ Respiratory □ Tissue □ Wound □ Urine □ Unknown □ Axilla/Groin swab □ Nares swab □ Other (please specify): __________</td>
</tr>
</tbody>
</table>

Isolates from sterile sites (e.g., blood, CSF) are required to be submitted to the local public health laboratory for additional testing. Please see CDPH Lab Reportable Diseases (PDF) for more information. If available, please attach a copy of the laboratory report to this case report form.
Candida auris Provider Reporting: Epidemiological Information

**EPIDEMIOLOGICAL INFORMATION**

<table>
<thead>
<tr>
<th>Has the patient had an overnight stay in a healthcare facility outside the US within the past 12 months? □ Yes □ No □ Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, name of country, facility (if known), and approximate dates: ____________________________</td>
</tr>
<tr>
<td>Does the patient have a history of an infection or colonization with a carbapenemase-producing organism (e.g., NDM-E.coli)?</td>
</tr>
<tr>
<td>□ Yes □ No □ Unknown</td>
</tr>
<tr>
<td>If yes, carbapenemase type and organism: ____________________________</td>
</tr>
<tr>
<td>If the patient screened positive for colonization (e.g., axilla/groin swab), why was the patient initially tested (check all that apply)?</td>
</tr>
<tr>
<td>□ Coming from facility with outbreak □ Potential exposure to a known case (e.g., point prevalence survey) □ Unknown</td>
</tr>
<tr>
<td>□ International healthcare/travel exposure □ Colonized with a carbapenemase-producing organism □ Other (specify): ____________________________</td>
</tr>
</tbody>
</table>

- Three key questions
  - Healthcare outside the United States
  - Co-colonized with a CPO
  - Reason for screening (i.e., why was this patient tested?)
Candida auris Isolate Submission

• Isolates identified from sterile site specimens represent:
  • Clinically-significant infections
  • ~8% of specimens overall in California

• **Purpose of submission**
  • Organism ID **confirmation**
  • **Antifungal susceptibility** testing and monitoring of resistance patterns
    • West Region AR Lab Network performs comprehensive AFST
  • Possible whole genome sequencing to inform **outbreak investigation, response and management**

Clinical Lab → Local Public Health Lab → CDPH Microbial Diseases Lab → West Region AR Lab Network
C. auris Testing at CDPH MDL
C. auris Confirmation Testing

• Test methodology:
  • Identification of yeast species by MALDI-TOF mass spectrometry
  • Turn around time is 2-3 days
  • Currently available at MDL

• Accepting pure culture on solid media in tube or flask with tightened screw cap that is taped
  • Isolates should be incubated at 25-30°C
  • Isolates can be shipped at ambient temperature
  • Please plan your shipping accordingly to avoid attempted delivery over the weekend or on holidays

• Submission requirements and points of contact can be found via CDPH MDL
  (www.cdph.ca.gov/Programs/CID/DCDC/Pages/TestOrderFungalIDYeastMALDI.aspx)
C. auris Confirmation Testing

• Pre-approval is not required for isolate submission
• Form 448 must be completed and accompany each specimen
  • For specific instructions, reference the Form 448 Electronic Submittal Form Instructions (www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDL-eform-448-Instructions.aspx)
  • Save MDL General Electronic Submission Form (PDF) from MDL Submission Forms page (www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDLSubmissionInstructionsandForms.aspx)
  • Open with Adobe Acrobat and select Fungus Culture for Identification-448 in drop down for “Select Test Requisition” at the top of the page
  • Fill out remaining patient/accession information (for more guidance, see General Specimen Submission Page 1 Instructions (www.cdph.ca.gov/Programs/CID/DCDC/General_Specimen_Submission_P1_Instructions.aspx))
  • Send with specimens following Category B shipping requirements
NEW - *C. auris* Colonization Screening

• Test methodology:
  • Real-time PCR for detection of *Candida auris* from patient skin swab specimens using BD-MAX
  • Culture-based testing will be performed on PCR-positives and indeterminate swabs
  • Turn around time is 2-3 days for PCR testing, and 7-14 days for culture screening
  • Go live at MDL at the end of Nov 2022
  • Cultures isolated from the patient specimens may be sent out for AFST or WGS at Regional APHL lab upon request

• Accepting axilla/groin skin swabs collected using BD ESwab
  • ESwab collection kits must be stored at 4-25°C
  • Specimens collected with ESwabs must be shipped with cold packs
  • ESwab specimen stability is 9 days from collection
  • Swab kits will be available on request, more info on kits to come!
NEW - *C. auris* Colonization Screening

• Pre-approval is required for submission; please contact CDPH’s HAI Program before submitting specimens ([HAIprogram@cdph.ca.gov](mailto:HAIprogram@cdph.ca.gov))

• Form 449 must be completed and accompany each specimen
  • Save **MDL General Electronic Submission Form (PDF)** from [MDL Submission Forms page](www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDLSubmissionInstructionsandForms.aspx)
  • Open with Adobe Acrobat and select **Candida auris Colonization Screening-449** in drop down for “Select Test Requisition” at the top of the page
  • Fill out remaining patient/accession information (for more guidance, see [General Specimen Submission Page 1 Instructions](www.cdph.ca.gov/Programs/CID/DCDC/Pages/General_Specimen_Submission_P1_Instructions.aspx))
  • Send with specimens following Category B shipping requirements
C. auris Testing at West Regional AR Lab Network
### Antibiotic Resistance Laboratory Network (ARLN) Test Menu

Use the searchable menu below for:
- Specimen collection and shipping instructions
- Specimen submission forms
- Pre-approval requirements
- Testing methodologies and frequencies
- Turnaround times and contact information

To ensure that specimens meet laboratory acceptance criteria, please review all appropriate content prior to specimen submission.

<table>
<thead>
<tr>
<th>Name</th>
<th>Updated</th>
</tr>
</thead>
</table>
| [Candida auris screening](www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthLaboratories/ARLNLabTestMenu#heading21701)
  *Candida, Fungal, AFST*                                              | 1/30/2020    |
| [Candida species Identification and Fungal Susceptibility Testing](www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthLaboratories/ARLNLabTestMenu#heading21701)
  *Candida, Fungal, AFST*                                              | 1/24/2020    |
| [Carbapenem-resistant Acinetobacter](www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthLaboratories/ARLNLabTestMenu#heading21701)
  *CR-Acinetobacter, CRAB, CR-AB*                                     | 1/24/2020    |
C. auris screening

- All screening must be coordinated through state and/or local public health and requires pre-approval by the AR Lab Network West Regional Lab

### Candida auris colonization screening

| Testing available          | • PCR (CDC assay)  
|                           | • Culture (isolate recovery)  
| TAT                       | 2-3 business days  
| Source                    | Axilla/groin bilateral composite  
| Swab                      | ESwab Liquid Amies Elution swab (flocked tip)  
| Expiration after collection | 9 days  
| Shipping conditions       | Cold  |
Candida Isolate Testing

- Please work with state and/or local public health to determine the appropriate submission pathway
- Upon request, supplies (slants, Category B shippers) can be provided

- All non-\textit{albicans} \textit{Candida} species accepted
- **Identification Method:** MALDI-TOF
- **AFST:** Broth microdilution (RPMI plates)
  - Amphotericin B
  - Anidulafungin
  - Caspofungin
  - Fluconazole
  - Isavuconazole
  - Itraconazole
  - Micafungin
  - Posaconazole
  - Voriconazole

- \textit{C.auris} WGS will be available soon, currently eligible isolates will be sequenced by CDC
Regional *C. auris* Prevention and Response Strategy
Preventing *C. auris* Emergence and Spread

- Target facilities with patients at highest risk of *C. auris* acquisition (LTACH, vSNF*)

86% of *C. auris* Cases Reported in LTACH and vSNF

*Long-term acute care hospitals (LTACH), ventilator-equipped skilled nursing facilities (vSNF) in jurisdictions adjacent to or with patient sharing networks with outbreak jurisdictions

[CDPH Regional *C. auris* Prevention and Response Strategy](https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Cauris_Phases.pdf)
Preventing *C. auris* Emergence and Spread

- In LTACH and vSNF*, carry out proactive:
  - baseline and follow-up point prevalence surveys and admission screening
  - onsite infection prevention and control assessments
  - species identification of all *Candida* isolates
  - use of List P or List K agent for daily and terminal cleaning and disinfection

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*Long-term acute care hospitals (LTACH), ventilator-equipped skilled nursing facilities (vSNF) in jurisdictions adjacent to or with patient sharing networks with outbreak jurisdictions CDPH Regional *C. auris* Prevention and Response Strategy (PDF) ([www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Cauris_Phases.pdf](http://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Cauris_Phases.pdf))
Preventing *C. auris* Emergence and Spread

- **In LTACH and vSNF**, carry out proactive:
  - baseline and follow-up point prevalence surveys and admission screening
  - onsite infection prevention and control assessments
  - species identification of all *Candida* isolates
  - use of List P or List K agent for daily and terminal cleaning and disinfection

- **In all facilities**:
  - Prioritize *Candida* species identification for patients with risk factors
  - Promote antimicrobial stewardship
  - In SNF, implement Enhanced Standard Precautions
  - Ensure interfacility transfer communication

*Long-term acute care hospitals (LTACH), ventilator-equipped skilled nursing facilities (vSNF) in jurisdictions adjacent to or with patient sharing networks with outbreak jurisdictions*  
[CDPH Regional *C. auris* Prevention and Response Strategy](https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Cauris_Phases.pdf)
Summary

- *C. auris* is an urgent public health threat and is now reportable in California
  - Electronic lab reporting
  - Provider reporting
  - Sterile site isolate submission
- Laboratory testing is available at local public health labs, CDPH MDL, and the West Region AR Lab Network
  - Colonization screening
  - Species identification
  - Antifungal susceptibility testing
  - Whole genome sequencing
Goals of Surveillance, Reporting, and Isolate Submission

- Enable early detection of *C. auris* in a region or facility
- Facilitate timely investigation and response
- Publish annual summary data and report to CDC
- Monitor antifungal resistance trends and emergence of new strains
- Support coordination between healthcare facilities, clinical laboratories, and public health departments to prevent and slow the spread of *C. auris*
Goals of Surveillance, Reporting, and Isolate Submission

• Enable early detection of *C. auris* in a region or facility
• Facilitate timely investigation and response
• Publish annual summary data and report to CDC
• Monitor antifungal resistance trends and emergence of new strains
• **Support coordination between healthcare facilities, clinical laboratories, and public health departments to prevent and slow the spread of *C. auris***
Recent and Upcoming Carbapenemase-producing Organism and C. auris Presentations

- **September 29th**: Carbapenemase-producing Organisms: Guidance for Reporting and Containment webinar slides (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CPO_ReportingAndPreventionWebinar_092922.pdf) and recording (youtu.be/dm4I2ooSA4M?t=79)

- **October 19th**: CalREDIE Local Users Call slides (calrediehelp.powerappsportals.us/luc-slides-2022.10.19.pdf#msdyntrtid=9Iq3h92dGljqJTf8wMlAFnXfaZB5qNtQCgwTpGCnjO4) and recording (urldefense.com/v3/__https:/cdph-ca-gov.zoom.us/rec/share/RLtzKRUYanMjuc3DMOSA_PyYviH1JPqBvMeLtNhX_FI_lvd7uCwaNNLhUZsVZe7.ae0MjNpnSWRuGkkZ?startTime=1666194904000__;!!AvL6XA!zUXWqks0cG7udJtLOy_bPzz54QaMA50np3PajED7vpDce_WBJJ3A2BiocfeoQNi4ntoSBdyfX7O-FmddPxn8IpeG9KheZJakRtU$) (passcode required)

- **October 27th**: Carbapenemase-producing Organisms: Carbapenemase Testing Strategies webinar slides (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH Document Library/CPO_webinar_102722.pdf) and recording (youtu.be/l6LPBB9EQ8c)

- **December TBD**: Carbapenemase-producing Organisms: Carbapenemase Testing to Inform Clinical Treatment Decisions webinar
Resources

- CDPH Antimicrobial Resistance (AR) Resources Webpage
  (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/AntimicrobialResistanceLandingPage.aspx)
- CDPH CPO and C. auris Screening Decision Tree (PDF)
  (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/Tier2_Pathogen_Screening_Decision_Tree_Oct2020.pdf)
- C. auris Reporting FAQ (PDF)
  (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH Document Library/CaurisReportingFAQ.pdf)
- CDPH C. auris Webpage
  (www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Candida-auris.aspx)
- MDL Submission Instructions and Forms
  (www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDLSubmissionInstructionsandForms.aspx)
- CDPH MDL Fungal Identification Submission Requirements
  (www.cdph.ca.gov/Programs/CID/DCDC/Pages/TestOrderFungallDYeastMALDI.aspx)
- CalREDIE Communicable Disease Control Forms (C. auris-specific form forthcoming)
  (www.cdph.ca.gov/Programs/PSB/Pages/CommunicableDiseaseControl.aspx)
Acknowledgements

• CDPH Microbial Diseases Laboratory:
  • Varvara Kozyreva
  • Matt Sylvester
  • Katelyn Chen

• CDPH HAI Program:
  • Diana Holden
  • Tisha Mitsunaga
  • Erin Epson

• West Regional Antimicrobial Resistance Lab Network
Thank you!

Questions?

For more information, contact
HAIProgram@cdph.ca.gov
Additional Slides
Potential for *Candida auris* misidentification

- Some commonly used phenotypic yeast identification systems can misidentify *Candida auris*. For more information, clinical laboratories can consult [CDC Identification of *Candida auris*](www.cdc.gov/fungal/candida-auris/identification.html), which includes a table summarizing the common misidentifications stratified by phenotypic method, and detailed [algorithms for when to suspect *Candida auris* based on laboratory method and initial species identification](www.cdc.gov/fungal/candida-auris/pdf/Testing-algorithm_by-Method_508.pdf).

- As more manufacturers have updated their libraries and software to include *Candida auris*, the potential for mischaracterization has become less of a cause for concern. However, laboratorians and public health departments should remain aware of these issues and refer to CDC guidance as yeast identification methods continue to change.
CSTE Nationally Notifiable Condition Update

- Council of State and Territorial Epidemiologists *C. auris* Position Statement (PDF)
  (www.cste.org/resource/resmgr/ps/ps2022/2022_Submission_Cauris_For_W.pdf)
Targeted Surveillance

- Public health laboratory surveillance was crucial for identifying outbreaks of CPOs and *C. auris* across California
- AR Lab Network surveillance for *Candida* and CRAB isolates
  - Testing services and supplies can be provided at no cost to the submitting healthcare facility or lab
  - More information available on the CDPH website (PDF) (www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CDPH_ARLN_TargetedSurveillance_Description_052521.pdf)

<table>
<thead>
<tr>
<th>Organism</th>
<th>Testing Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-albicans <em>Candida</em></td>
<td>1. Species confirmation</td>
</tr>
<tr>
<td></td>
<td>2. Antifungal susceptibility testing</td>
</tr>
<tr>
<td>Carbapenem-resistant <em>Acinetobacter baumannii</em> (CRAB)</td>
<td>1. Species confirmation</td>
</tr>
<tr>
<td></td>
<td>2. Carbapenemase testing</td>
</tr>
<tr>
<td></td>
<td>3. Antimicrobial susceptibility testing</td>
</tr>
</tbody>
</table>
Additional ELR Guidance for *C. auris* Reporting

- Use the most specific SNOMED and LOINC codes for all ELR messages.
  - For LOINC codes, send the Long Common Name to accompany the LOINC code in messaging.
  - If using a LOINC code that is non-specific (e.g., 98394-0, Candida sp in Isolate by MS.MALDI-TOF), indicate the genus and species associated with the result, as well as the specimen source.
  - Use LOINC codes that indicate yeast rather than bacterial identification methods (e.g., 601-5, Fungus identified in Blood by Culture rather than 600-7, Bacteria identified in Blood by Culture).
  - If specimen source and genus and species are indicated in the comments, please ensure that these results are also indicated in an OBX segment using the appropriate LOINC or SNOMED code.
**Example SNOMED and LOINC Codes relevant to *C. auris* Reporting**

- **SNOMED lookup** ([browser.ihtsdotools.org/](http://browser.ihtsdotools.org/))
- **LOINC term lookup** ([search.loinc.org/](http://search.loinc.org/))

<table>
<thead>
<tr>
<th>LOINC Code</th>
<th>LOINC Name (Long Common Name)</th>
<th>SNOMED Code</th>
<th>SNOMED Name</th>
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</thead>
<tbody>
<tr>
<td>94419-9</td>
<td>Candida auris [Presence] in Isolate by MS.MALDI-TOF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90002-7</td>
<td>Candida auris [Presence] in Specimen by Organism specific culture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>96302-5</td>
<td>Candida auris DNA [Presence] by NAA with non-probe detection in Positive blood culture</td>
<td>260373001 260415000</td>
<td>Detected Not Detected</td>
</tr>
<tr>
<td>92791-3</td>
<td>Candida auris DNA [Presence] by NAA with probe detection in Positive blood culture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91081-0</td>
<td>Candida sp DNA [Presence] in Specimen by NAA with probe detection*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>87620-1</td>
<td>Candida auris ITS2 gene [Presence] in Specimen by NAA with probe detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95766-2</td>
<td>Candida auris DNA [Presence] in Blood by NAA with non-probe detection</td>
<td>10828004 260385009</td>
<td>Positive Negative</td>
</tr>
<tr>
<td>95765-4</td>
<td>Candida auris DNA [Presence] in Specimen by NAA with non-probe detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95764-7</td>
<td>Candida auris DNA [Presence] in Urine by NAA with non-probe detection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Summary of Changes to 22CCR2500-2505

<table>
<thead>
<tr>
<th>Type of Change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition to 2500 (j)</td>
<td>• Added <em>Candida auris</em>, colonization or infection, to be reported within one working day of identification (+)</td>
</tr>
<tr>
<td>Addition to 2505 (e) (2)</td>
<td>• Added <em>Candida auris</em>, colonization or infection</td>
</tr>
<tr>
<td></td>
<td>• Added Carbapenemase-producing organism, colonization or infection</td>
</tr>
<tr>
<td>Remove from 2505 (e)</td>
<td>• Removed Carbapenem-resistant Enterobacteriaceae (Carbapenemase-producing)(CP-CRE)</td>
</tr>
<tr>
<td>Requirement added to 2505</td>
<td>• Added requirement to send sterile site isolates for <em>Candida auris</em> [within 10 working days]</td>
</tr>
</tbody>
</table>
C. auris Isolate Submission Pathways

Local health departments decide how clinical labs in their jurisdiction should submit.